

What is claimed is:

1. A method of producing semiconductor devices by cobalt salicide technology with titanium nitride film as the cap film, comprising:

removing said titanium nitride film using a hydrogen peroxide-water mixture.

2. A method of producing semiconductor devices according to Claim 1, wherein the concentration of said hydrogen peroxide-water mixture is within a range of 1 to 30 vol% hydrogen peroxide in terms of water.

3. A method of producing semiconductor devices according to Claim 2, wherein the concentration of the above-mentioned hydrogen peroxide-water mixture is within a range of 10 to 20 vol% hydrogen peroxide in terms of water.

4. A method of producing semiconductor devices,
comprising:

forming cobalt film on the top surface of a silicon substrate, which has a gate electrode and a diffusion layer;

forming titanium nitride film as the cap film on the top surface of said cobalt film;

selectively reacting the silicon of said silicon substrate and the cobalt of said cobalt film; and

removing said titanium nitride film using a hydrogen peroxide-water mixture.

5. A method of producing semiconductor devices by cobalt salicide technology with titanium film as the cap film, comprising:

10. A method of producing semiconductor devices according to Claim 9, wherein the concentration of said ammonia-hydrogen peroxide-water mixture is within a range of 1 to 30 vol% hydrogen peroxide in terms of water and within a range of 1 to 30 vol% ammonia in terms of water and the concentration of said hydrogen peroxide-water mixture is within a range of 1 to 30 vol% hydrogen peroxide in terms of water.

11. A method of producing semiconductor devices according to Claim 10, wherein the concentration of said ammonia-hydrogen peroxide-water mixture is within a range of 10 to 20 vol% hydrogen peroxide in terms of water and within a range of 5 to 20 vol% ammonia in terms of water and the concentration of said hydrogen peroxide-water mixture is within a range of 1 to 30 vol% hydrogen peroxide in terms of water.

12. A method of producing semiconductor devices, comprising:

forming cobalt film on the top surface of a silicon substrate, which has a gate electrode and a diffusion film;

forming titanium nitride film as the cap film on the top surface of said cobalt film;

selectively reacting the silicon of said silicon substrate and the cobalt of said cobalt film;

removing said titanium nitride film by a first removal step using an ammonia-hydrogen-peroxide-water mixture; and

removing said titanium nitride film by a second removal step using a hydrogen peroxide-water mixture.

13. A method of producing semiconductor devices by cobalt salicide technology with titanium film as the cap film, comprising:

removing said titanium film by a first removal step using an ammonia-hydrogen peroxide-water mixture and

removing said titanium film by a second removal step using a hydrogen peroxide-water mixture.

14. A method of producing semiconductor devices according to Claim 13, wherein the concentration of said ammonia-hydrogen peroxide-water mixture is within a range of 1 to 30 vol% hydrogen peroxide in terms of water and within a range of 1 to 30 vol% ammonia in terms of water and the concentration of said hydrogen peroxide-water mixture is within a range of 1 to 30 vol% hydrogen peroxide in terms of water.

15. A method of producing semiconductor devices according to Claim 14, wherein the concentration of said ammonia-hydrogen peroxide-water mixture is within a range of 10 to 20 vol% hydrogen peroxide in terms of water and 5 to 20 vol% ammonia in terms of water and the concentration of said hydrogen peroxide-water mixture is within a range of 1 to 30 vol% in terms of water.

16. A method of producing semiconductor devices, comprising:

forming cobalt film on the top surface of a silicon substrate, which has a gate electrode and a diffusion layer;

forming titanium film as the cap film on the top surface of said cobalt film;

selectively reacting the silicon of said silicon substrate and the cobalt of said cobalt film;

removing said titanium film by a first removal step using an ammonia-hydrogen peroxide-water-mixture; and

removing said titanium film by a second removal step using a hydrogen peroxide-water mixture.

17. An etching liquid, which is a hydrogen peroxide-water mixture for removal of titanium nitride film on the top surface of cobalt film or cobalt silicide (CoSi).

18. An etching liquid, which is a hydrogen peroxide-water mixture for removal of titanium film on the top surface of cobalt film or cobalt silicide (CoSi).